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Queen Ribbon & Carbon Co. 4-55

STAT

DA INTELLIGENCE REPORT (Use this form only in accordance with instructions in SR 380-305-5)	CLASSIFICATION	COUNTRY REPORTED ON
	UNCLASSIFIED	Yugoslavia

DATE OF REPORT 18 June 1957

SUBJECT VINODOL Power Plant

	CLASSIFICATION	
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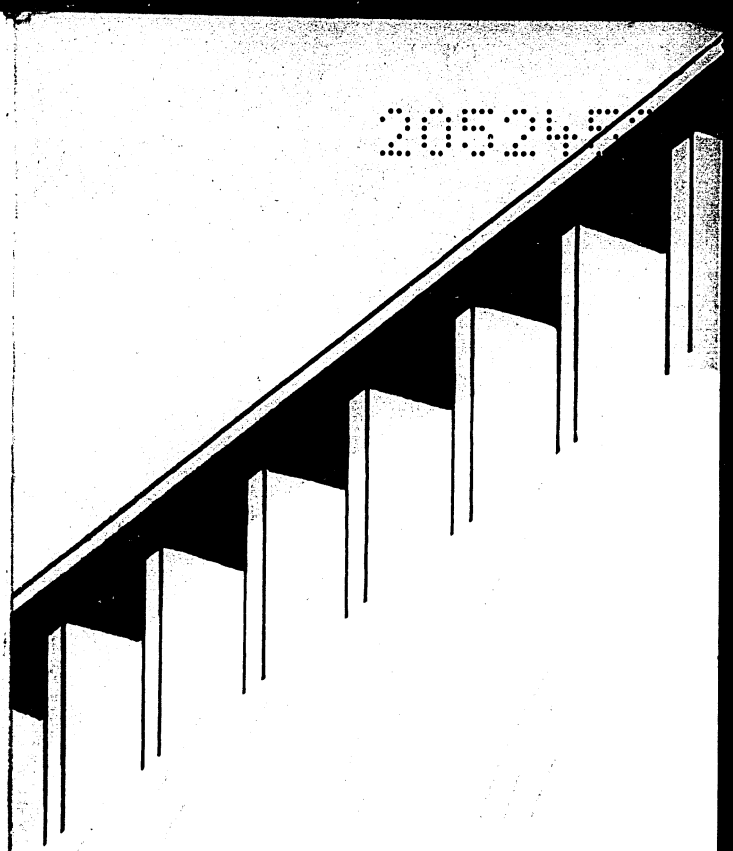
PROJEKAT: ELEKTROPROJEKT - ZAGREB
IZVEDBA: HIDROELEKTRA - ZAGREB
MONTAŽA: HIDROMONTAŽA - MARIBOR



VINODOL

STAT

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HIDROELEKTRANA

»NIKOLA TESLA«

VINODOL

HYDROELECTRIC PLANT

»NIKOLA TESLA«

VINODOL

AMENAGEMENT HYDROELECTRIQUE

»NIKOLA TESLA«

VINODOL

HIDROELEKTRISCHE ANLAGE

»NIKOLA TESLA«

VINODOL

1952

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Hrvatski	English
UZDUŽNI PROFIL	**LONGITUDINAL SECTION**
Pregrada Križ	Križ Dam
Pregrada Lokvarka	Lokvarka Dam
Spojni tunel	Connecting tunnel
Vodna komora	Surge chamber
Zasunska komora	Valve Chamber
Strojarnica Fužine	Powerhouse Fužine
Pregrada Bajer	Bajer Dam
Ulazni uređaj	Intake
Tunel Bajer	Tunnel Bajer
Cjevovod Lič	Pipe-line Lič
Kosi rov	Sloped shaft
Strojarnica Tribalj	Powerhouse Tribalj
Odvodni tunel i kanal	Tailrace tunnel and channel
SITUACIJA	**PLAN**
Jezero	Lake, Basin
KARAKTERISTIKA POSTROJENJA	**PLANT CHARACTERISTICS**
Srednja godišnja korisna protoka	Average yearly useful discharge
Veličina izgradnje	Instaled capacity
Bruto padovi	Brutto Head
Najveći	Maximal
Srednji	Average
Najmanji	Minimal
Radnja 1 m³ vode	Energy of 1 cub m water
Instalirana snaga	Installed power
Snaga na sabirnicama	Power on busses
Raspoloživa energija	Disposable energy
Mokra godina	Wet year
Srednja godina	Mean year
Suha godina	Dry year
Akumulirana energija	Stored energy
Ukupno	Total
PODACI O GLAVNIM OBJEKTIMA	**DATA ON PRINCIPAL FEATURES**
1. Pregrada Križ	**1. Križ Dam**
Sadržina jezera	Volume of storage
Sadržina pregrade	Volume of dam
Max. visina	Maximal height
Duljina u kruni	Crest length
Tip pregrade	Dam type
Nasuta	Earth dam
2. Pregrada Lokvarka	**2. Lokvarka dam**
Vidi pod 1	See under 1.

Français	Deutsch
PROFIL EN LONG	**LAENGSPROFIL**
Barrage Križ	Talsperre Križ
Barrage Lokvarka	Talsperre Lokvarka
Galerie de liaison	Verbindungstunnel
Chambre d'équilibre	Wasserschloss
Chambre à valves	Schieber
Usine Fužine	Kraftwerk Fužine
Barrage Bajer	Talsperre Bajer
Prise d'eau	Einlaufwerk
Galerie Bajer	Tunnel Bajer
Galerie d'amménée sous pression forcée	Druckrohrenleitung
Galerie en pente avec conduite forcée	Geneigter Stollen
Usine Tribalj	Kraftwerk Tribalj
Canal de fuite en galerie et canal	Unterwasser tunnel und Kanal
PLAN	**GRUNRISS**
Lac de réserve	Stausee
CARACTERISTIQUE DE L'AMENAGEMENT	**WERKSKARAKTERISTIK**
Moyenne annuelle du débit	Mittlere autabare Jahreswassermenge
Débit installé	Ausbauwassermenge
Chute brutte	Bruttogefälle
Maximum	Größtes
Moyenne	Mittleres
Minimum	Kleinstes
Energie d'un m³ d'eau	Arbeit 1 m³ Wasser
Puissance installée	Installierte Leistung
Puissance aux barres	Sammelschienenleistung
Energie disponible	Verfügbare Energie
Année humide	Nasses Jahr
Année moyenne	Mittleres Jahr
Année sèche	Trockenes Jahr
Energie emmagasinée	Aufgespeicherte Energie
Au total	Insgesamt
CARACTERISTIQUES DES OUVRAGES PRINCIPAUX	**ANGABEN FUR HAUPTOBJEKTE**
1. Barrage Križ	**1. Talsperre Križ**
Volume du lac artificiel	Inhalt der Stausee
Volume du barrage	Inhalt der Mauer
Hauteur maximum	Max. Höhe
Longueur en crête	Länge der Krone
Type du barrage	Staumauer Type
Barrage en terre	Erddamm
2. Barrage Lokvarka	**2. Talsperre Lokvarka**
Voir no. 1	Sehen unter 1.

Hrvatski	English
3. Tunel Lokvarka - Ličanka	**3. Tunnel Lokvarka—Ličanka**
Ukupna duljina	Total length
Površina iskopa	Area of excavation
Površina betona	Area of concrete
Duljina poteza	Length of section
Max. stat. tlak	Max. stat. pressure
4. Strojarnica Fužine	**4. Powerhouse Fužine**
5. Pregrada Bajer	**5. Bajer Dam**
Vidi pod 1.	See under 1.
Masivna gravit. betonska	Concrete gravity
6. Armirano betonski tl. cjevovod Lič	**6. Pressure pipeline Lič. reinforced concrete**
Ukupna duljina	Total length
Površina arm. betona	Area of reinf. concrete
Srednja količina armature po 1 m³	Average quantity of reinforcement
Max. stat. tlak	Max. stat. pressure
7. Tunel Kobiljak - Razomir	**7. Tunnel Kobiljak—Razomir**
Vidi pod 3.	See under 3.
8. Kosi rov	**8. Sloped schaft with pressure pipeline**
Ukupna duljina	Total length
Površina iskopa	Area of excavation
Kut nagiba	Angle of inclination
Max. stat. tlak u čeličnom cjevovodu	Max. stat pressure in steel pipe-line
9. Rasklopno postrojenje 35 kV	**9. Swith-gear 35 kV**
14 polja podzemno	14 cells underground
10. Rasklopno postrojenje 110 kV	**10. Switchgear 110 kV**
14 polja nadzemno	14 fields, open
11. Strojarnica Vinodol	**11. Powerhouse Vinodol**
Oprema	Equipment
Tri glavna agregata sa po dvije turbine Pelton, sa po jednim mlaznom i jednim generatorom na zajedničkoj osovini	Three main units each consisting of two turbines Pelton with one jet and one generator on one horizontal axis
Generator	Generator
Nazivna snaga	Rated power
Napon	Tension
Broj okretaja	Revolutions per min.
Težina statora	Weight of stator
Težina rotora	Weight of rotor
Normalni potrošak jedne turbine	Normal discharge of one turbine
Snaga turbine	Turbine power
Težina kola	Wheel weight
Jedan kutni agregat sa turbinom Pelton i generatorom	Auxiliary unit consisting of turbine Pelton and generator

Français	Deutsch
3. Galerie Lokvarka—Ličanka	**3. Tunnel Lokvarka—Ličanka**
Longueur totale	Gesamtlänge
Section d'excavation	Aushubfläche
Section betonnée	Ausbetonierte Fläche
Longueur de la tranche	Streckenlänge
Pression statique max.	Max. statischer Druck
4. Usine Fužine	**4. Kraftbau Fužine**
5. Barrage Bajer	**5. Talsperre Bajer**
Voir no. 1	Sehen unter 1.
Barrage poids en beton	Massive betonierte Gewichtsmauer
6. Galerie d'ammenée sous pression Lič, beton armé	**6. Druckleitung Lič aus Eisenbeton**
Longueur totale	Gesamtlänge
Section du betons armé	Fläche der Eisen Beton
Quantité moyenne d'armature	Durchschnittliche Eisenmenge pro Lauf. M.
Pression statique max.	Max. statischer Druck
7. Galerie Kobiljak—Razomir	**7. Tunnel Kobiljak—Razomir**
Voir no. 1.	Sehen unter 3.
8. Galerie en pente avec conduite forcée	**8. Geneigter Stollen mit Druckrohrleitung**
Longueur totale	Gesamtlänge
Section d'excavation	Aushubfläche
Angle d'inclinaison	Neigungswinkel
Pression statique max. de la conduite en acier	Max. statischer Druck
9. Appareillage 35 kV	**9. Schaltanlage 35 kV**
14 cellules en caverne	14 Zellen unterirdisch
10. Station 110 kV	**10. Schaltanlage 110 kV**
14 champs à 1 air libre	14 Felder Freiluftanlage
11. Usine Vinodol	**11. Kraftbau Vinodol**
Equipement	Ausrüstung
Trois unités à arbre horizontal commun à l'alternateur et aux deux roues Pelton à un jet, situées de part et d'autre	Drei Aggregate: Generator mit je 2 freiliegenden, einstrahligen Pelton Rädern aus gemeinsamen horizontaler Welle
Alternateur	Generator
Puissance nominale	Nennleistung
Tension	Spannung
Vitesse	Umdrehungszahl
Poids du stator	Gewicht, Stator
Poids du rotor	Gewicht, Rotor
Débit normal d'une turbine	Normale Schluckfähigkeit eines Peltonrades
Puissance de la turbine	Nennleistung
Poids de la roue	Gewicht des Rades
Unité auxiliaire : turbine Pelton — alternateur	Hausaggregat: Peltonturbine mit Generator

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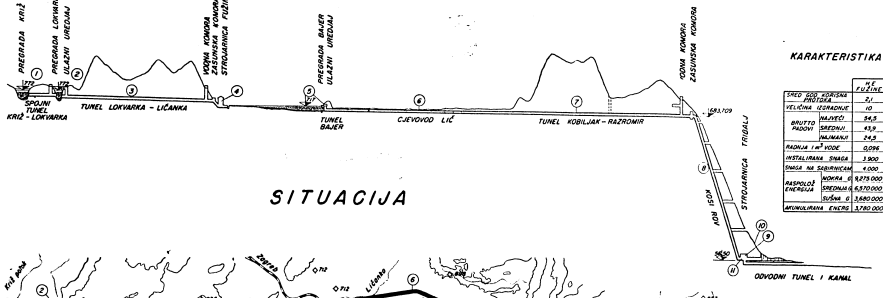
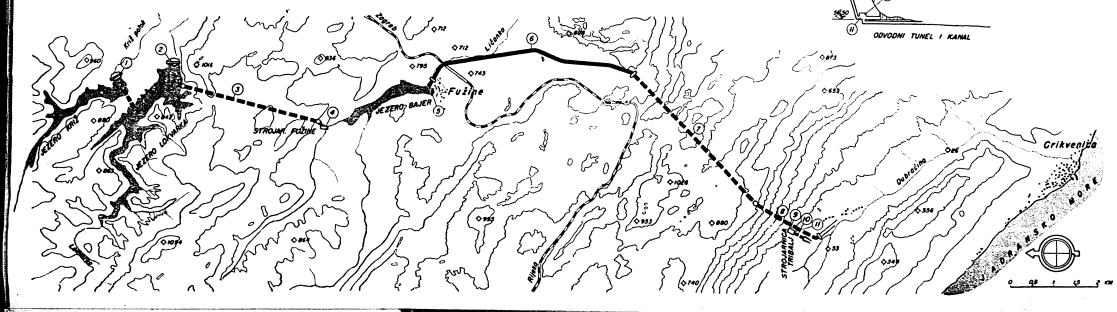
UZDUŽNI PROFIL



KARAKTERISTIKA POSTROJENJA

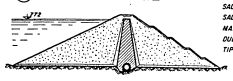
		HE FUŽINE	HE VINODOL	UKUPNO	DIM
SRED. GOD. KORISNA PROTOKA		21	3,85		m^3/s
VELIČINA VODNOG JASTVA		10	15		m^3/s
BRUTTO PADOVI	NAJVEĆI	54,5	663,5		m
	SREDNJI	43,9	656,0		m
	NAJMANJI	24,5	636,5		m
RADNJA 1 m^3 VODE		0,096	1,91		kWh
INSTALIRANA SNAGA		3 900	84 000	87 900	kW
SNAGA NA SABIRNICAMA		4 000	76 000	80 000	kW
RASPOLOŽ. ENERGIJA	NORMA G	9,278 000	263,250 000	272,525 000	kWh
	SREDNJA G	6,570 000	183,300 000	189,870 000	kWh
	SUŠNA G	3,680 000	107,500 000	111,180 000	kWh
AKUMULIRANA ENERG		3,780 000	41 220 000	45,000 000	kWh

SITUACIJA



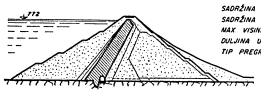
PODACI O GLAVNIM OBJEKTIMA

① PREGRADA KRIŽ



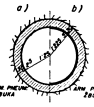
SADRŽINA JEZERA	6,0 mil m^3
SADRŽINA PREGRADE	350.000 m^3
MAX. VISINA	30 m
DULJINA U KRUNI	250 m
TIP PREGRADE :	NASUTA

② PREGRADA LOKVARKA



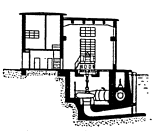
SADRŽINA JEZERA	30,5 mil m^3
SADRŽINA PREGRADE	560.000 m^3
MAX. VISINA	47 m
DULJINA U KRUNI	276 m
TIP PREGRADE :	NASUTA

③ TUNEL LOKVARKA - LIČANKA



UKUPNA DULJINA	3463 m
POVRŠINA ISKOPA	7,8 m^2
POVRŠINA BETONA	2,7 m^2
DULJINA POTEZA a)	3050 m
DULJINA POTEZA b	413 m
MAX. STAT. TLAK	4,5 at

④ STROJARNICA FUŽINE



TURBINA - GENERATOR :	N = 3900 kW
	n = 375 o/min
PUMPA - EL MOTOR :	N = 5150 kW
	n = 375 o/min

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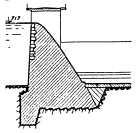
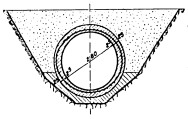
⑤ PREGRADA BAJER



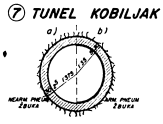
SADRŽINA JEZERA	1,2 mil	m^3
SADRŽINA PREGRADE	9.000	m^3
MAX. VISINA	10	m
DULJINA U KRUNI	100	m
TIP PREGRADE :	masivna gravit betonska	

⑥ ARMIRANO BETONSKI TL. CJEVOVOD LIČ



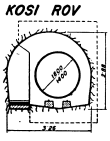
UKUPNA DULJINA	4915	m
POVRŠINA ARM. BET	2,4	m^2
SREDNJA KOLIČINA ARMATURE PO 1 m'	260	kg/m'
MAX. STAT. TLAK	1,9	at

⑦ TUNEL KOBILJAK – RAZROMIR



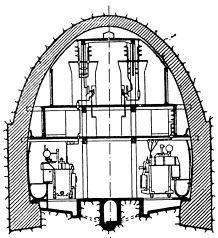
UKUPNA DULJINA	4162	m
POVRŠINA ISKOPA	91	m^2
POVRŠINA BETONA	2,9	m^2
DULJINA POTEZA a.)	3493	m
DULJINA POTEZA b.)	669	m
MAX. STAT. TLAK	32	at

⑧ KOSI ROV



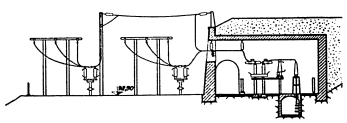
UKUPNA DULJINA	1189	m
POVRŠINA ISKOPA	8	m^2
KUT NAGIBA	32°	
MAX. STAT. TLAK U ČELIČNOM CJEVOVODU	66	at

⑨ RASKLOPNO POSTROJENJE 35 kV



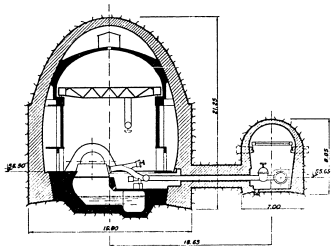
3 TRANSFOMATORA 35.000 kVA, 10,5 / 10,5 kV ± 5 %
2 TRANSFORMATORA 10.000 kVA, 11/3,3-6,36,75 kV ± 11 %
RASKLOPNO POSTROJENJE 35 kV – 14 POLJA (PODZEMNO)

⑩ RASKLOPNO POSTROJENJE 110 kV



RASKLOPNO POSTROJENJE 110 kV – 14 POLJA (NADZEMNO)

⑪ STROJARNICA TRIBALJ



OPREMA :

TRI GLAVNA AGREGATA SA PO DVIJE TURBINE PELTON SA PO-JEDNIM MLAZOM I JEDNIM GENERATOROM NA ZAJEDNIČKOJ HORIZONT OSOVINI

GENERATOR

NAZIVNA SNAGA	35.000	kVA
NAPON	10.500	KS
BROJ OKRETAJA	500	o/min
TEŽINA STATORA	60	t
TEŽINA ROTORA	68	t

TURBINA

NORMALNI POTROŠAK JEDNE TURBINE	2,5	m^3/sek
SNAGA TURBINE	19.500	KS
TEŽINA KOLA	4,5	t

JEDAN KUĆNI AGREGAT SA TURBINOM PELTON I GENERATOROM

GENERATOR

NAZIVNA SNAGA	470	kVA
BROJ OKRETAJA	1500	o/min
UKUPNA TEŽINA	2600	kg

TURBINA :

NORMALNI POTROŠAK	75	l/sek
SNAGA	360	KS

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